



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,907	11/26/2001	Sekharipuram R. Narayanan	06618/733001 / CIT 3338	7370

20985 7590 11/03/2003

FISH & RICHARDSON, PC  
12390 EL CAMINO REAL  
SAN DIEGO, CA 92130-2081

EXAMINER
----------

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
----------	--------------

1746

DATE MAILED: 11/03/2003

13

Please find below and/or attached an Office communication concerning this application or proceeding.

C10-13

**Office Action Summary**

Application No.

09/994,907

Applicant(s)

NARAYANAN ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 August 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-9 and 14-20 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 08 January 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action addresses claims 1-9, 14-19, and newly added claim 20. Claims 1, 2, 4-9 and 14-19 remain rejected under 35 USC §102 and §103 for the reasons of record. Claim 20 is newly rejected under 35 USC §103, as necessitated by amendment. Claims 18 and 19 remain rejected under 35 USC §112, first paragraph. Claim 3 is objected to as containing allowable subject matter. As applicant's amendment necessitated the new grounds of rejection presented herein, this action is made final.

### ***Oath/Declaration***

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because: Non-initialed and/or non-dated alterations have been made to the oath or declaration (in the second inventor's address). See 37 CFR 1.52(c).

### ***Drawings***

3. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on January 8, 2003 have been accepted. Applicants are reminded of their obligation to timely

submit a proper drawing correction or corrected drawings. The correction to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

4. Claims 18 and 19 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a *current* which travels along a length or width of a cell, does not reasonably provide enablement for a *voltage* which travels along a length or width of the cell. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. It is submitted that a person skilled in the art would not know how a voltage “travels.” A “voltage” is commonly understood as a potential difference between two points. As such, it is unclear how a voltage “travels.” Applicants have indicated that these claims were amended to obviate this rejection, but these claims have not in fact been amended.

***Claim Rejections - 35 USC § 102***

5. Claims 1, 4, 5, 7-9, and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Watkins et al (U.S. Patent 5,108,849). Regarding claims 1 and 5, the reference is directed to a fuel cell comprising a plurality of adjacent membranes (see Figure 1; col. 7, line 22). Regarding claims 1, 5, 14, and 17, a plurality of electrodes (16, 18) are in contact with the membranes. A plurality of interconnects (12, 13) are located between adjacent ones of the electrodes.

Regarding claim 1, current flows in a direction across the membranes. Regarding claims 1, 4, and 5, the ratio of the area of an interconnect to the area of an electrode is at least 0.2 (the interconnects are substantially the same size as the membranes; see Fig. 1). Regarding claims 8 and 9, the interconnect comprises graphite and a thermoplastic heat curing binder (see col. 4, lines 11-41). Regarding claims 15, 16, 18, and 19, the current inherently travels along the length and width of the cells. Regarding claim 7, the reference does not expressly teach that the interconnect is "formed of a paste." However, this limitation is a process limitation because it recites the state of the interconnect material before the final product is formed, and therefore does not need to be accorded patentable weight. Generally, process limitations in product claims do not need to be accorded patentable weight since they do not further limit the structure of the product (MPEP §2113).

Thus, the instant claims are anticipated.

6. Claims 1, 2, 4, 5 and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsukui et al (U.S. Patent 4,537,840). Regarding claims 1 and 5, the reference is directed to a fuel cell comprising a plurality of substantially parallel membranes (4) (see Figures 1 and 3). Regarding claims 1, 5, 14, and 17, a plurality of electrodes (2, 3) are in contact with the membranes (see Figs. 1 and 2). A plurality of interconnects (20, 25) are located between adjacent ones of the electrodes. Regarding claim 1, current flows in a direction across the membranes. Regarding claims 1, 4, and 5, the ratio of the area of an interconnect to the area of an electrode is at least 0.2 (the interconnects are substantially the same size as the membranes;

Art Unit: 1746

see Fig. 2). Regarding claim 2, a wicking part (26) feeds methanol to the membranes (see Fig. 2). Regarding claims 15, 16, 18, and 19, the current inherently travels along the length and width of the cells.

Thus, the instant claims are anticipated.

7. Claims 1, 5, 6 and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 19624887. Regarding claims 1 and 5, the reference is directed to a fuel cell comprising a plurality of substantially adjacent parallel membranes (8; see abstract, Figure 1). Regarding claims 1, 5, 14, and 17, a plurality of electrodes (7, 11) are in contact with the membranes (see Fig. 1, abstract). A plurality of interconnects (12) are located between adjacent ones of the electrodes (see col. 8, line 58). Regarding claim 1, current flows in a direction across the membranes. Regarding claims 1, 4, 5, and 6, the ratio of the area of an interconnect (12) to the area of an electrode (7) is substantially 0.2 (see Fig. 1). Regarding claims 15, 16, 18, and 19, the current inherently travels along the length and width of the cells.

Thus, the instant claims are anticipated.

8. Claims 5, 7, 9, and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Mayer et al (U.S. Patent 5,393,619).

Regarding claims 5 and 17, the reference is directed to a fuel cell having a plurality of membranes (13) substantially adjacent with each other (see abstract; Figure 1). Electrodes (11,

Art Unit: 1746

12) are associated with each membrane. A cell separator (i.e., interconnector) (21) is located between the electrodes of adjacent cells (see Figure 1). Regarding claim 7, the method of making the fuel cell includes the steps of coating an interconnect paste on electrodes associated with the membranes (col. 4, lines 38-42), and hot pressing the electrodes to form a membrane electrode assembly (col. 4, line 65). Regarding claim 9, the paste contains a heat-curable resin (see column 4, lines 63-66). Regarding claims 18 and 19, the current inherently travels along the length and width of the cells.

Thus, the instant claims are anticipated.

***Claim Rejections - 35 USC § 103***

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer et al. in view of Kato (U.S. Patent 6,127,059).

Mayer et al. is applied to claims 5, 7, 9, and 17-19 for the reasons stated above.

However, Mayer et al. do not expressly teach the step of coating a catalyst layer on the membranes.

The patent of Kato is directed to PEM fuel cells. In column 4, line 57 et seq., the reference teaches that a catalyst layer is directly coated onto an electrolyte membrane.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Kato to incorporate the step of coating the membranes with catalyst into the process of Mayer et al. In the cited passage, Kato teaches that this produces a "solid polymer electrolyte

Art Unit: 1746

having an integrally formed catalyst layer.” Accordingly, since the intimate contact of the catalyst and membrane would be beneficial to fuel cell performance, the artisan would be motivated to incorporate the step of coating the membranes with catalyst into the process of Mayer et al.

### *Response to Arguments*

10. Applicant’s arguments filed July 10, 2003 have been fully considered but they are not persuasive. Regarding the Watkins reference, Applicants generally assert that the reference teaches only a single membrane electrode assembly and thus does not anticipate the claims. Previously, the Examiner asserted that Watkins teaches a plurality of cells in column 7, line 22, reproduced as follows:

In multi-cell arrangements the other major surface of the plate may also include a continuous traversing channel. The two flow fields on opposite sides of such a single so-called “bi-polar” plate supply the fuel gas to to the anode of one cell and the oxidant gas to the cathode of the adjacent cell.

However, Applicants state that “[t]he passage in column 7, line 22 again describes multi-cell arrangements, and describes that or how other multi-cell arrangements might work. It never describes that Watkins himself uses a multi-cell arrangements.” In response, it is submitted that the passage does in fact describe that Watkins himself uses a multi-cell arrangement. Applicants further point to the fact that only one cell is illustrated in Figure 1. However, an illustration of an invention in a patent is not limiting and must be viewed in the context of the entire disclosure. Thus, it is maintained that Watkins, as a whole, discloses with sufficient specificity all the elements of claim 1, and thus anticipates the claim.



Regarding the Tsukui reference, Applicants assert that the reference “does not teach a plurality of electrochemical cells which are connected together.” In response, it is noted that Tsukui teaches in column 7, line 15 that “FIG. 3 is a perspective view showing the appearance of the fuel battery which is constructed by laminating the single cells of FIG. 2.” Thus, it is seen that Tsukui does in fact teach the subject matter of claim 1, i.e., a plurality of interconnects between two adjacent electrodes. Accordingly, the rejection under §102 over Tsukui is believed to be proper and is maintained herein.

*Allowable Subject Matter*

11. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Claim 3 recites, among other features, that the wicking part feeds methanol to only the edge portion of the membrane of the electrochemical cell. Tsukui et al. teach a wicking part that feeds methanol to the side face of the membrane (22) via a fuel electrode (28) in Figure 2, but do not teach or fairly suggest that methanol is fed only to the lateral edge of the membrane.

Accordingly, claim 3 contains allowable subject matter.

*Conclusion*

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051 (prior to December 17, 2003) or (571) 272-1299 (after December 17, 2003). The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

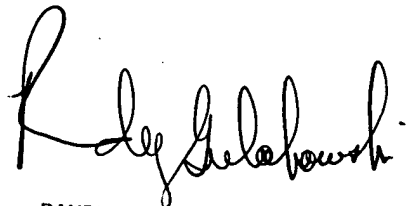
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).

Art Unit: 1746

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

October 24, 2003

A handwritten signature in black ink, appearing to read "Randy Gulakowski". The signature is fluid and cursive, with a large initial "R" and a long, sweeping underline.

RANDY GULAKOWSKI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700